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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/037,966      | 12/21/2001  | Oskar J. Painter     | CQC14NP             | 7507             |

36394 7590 07/09/2003

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EXAMINER

VALENCIA, DANIEL E

ART UNIT PAPER NUMBER

2874

DATE MAILED: 07/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/037,966

Applicant(s)

PAINTER ET AL.

Examiner

Daniel E Valencia

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-139 is/are pending in the application.
- 4a) Of the above claim(s) 5-11, 28-46 and 60-139 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 12-27 and 47-59 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-139 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I (claims 1-74), species 4 in Paper No. 4 is acknowledged. Accordingly, claims 1-4, 12-27, and 47-59 will be examined. In the previous Office Action (paper No. 2) claim 63 was erroneously not included in species 10 and will not be examined.

### ***Inventorship***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### ***Specification***

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

Art Unit: 2874

requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 12-18, 23-27, and 47-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abeles U.S. Patent No. 6,445,724. Refer to the appropriate drawings or parts of the specification. Abeles discloses a master oscillator vertical emission laser with essentially all the elements of the claimed invention. Regarding claims 1 and 23, Abeles discloses an optical device (fig 4), comprising: a transmission optical waveguide (303 and 352); and an optical device component (340 and 341) transverse-coupled to the transmission optical waveguide to as to enable optical signal power transfer therebetween, the transmission optical waveguide being adapted for at least one of receiving optical signal power from an optical signal transmission system and transmitting optical signal power to the optical signal transmission system, the optical device component including a laterally-confined multi-layer dispersion engineered waveguide structure the multi-layer waveguide structure (300b) including at least one multi-layer reflector stack (340 or 341), the optical device component being transverse-coupled to the transmission optical waveguide at the multi-layer waveguide

structure. Abeles's disclosure further shows that the device has a low-index waveguide being a fiber optic transmission (col. 5, lines 35-60) waveguide being adapted for transverse-coupling, wherein the waveguide is adapted for at least one of receiving an optical signal from a fiber-optic telecommunication system and transmitting optical signal power to a fiber optic telecommunication system (col. 1, lines 20-40), as explained in claims 2-4. With reference to claim 12, Abeles discloses that the waveguide structure includes an active layer (342 and col. 5, lines 36-60; but different active layers) being adapted so that varying a control signal (col. 5, line 51 and 330 and 331) applied to the active layer results in at least one of varying optical loss and varying modal index for the waveguide structure. Abeles further discloses that the structure includes electrical contacts (330 and 331) with the active layer therebetween, the control signal being an electronic control signal applied through the electrical contact layers (col. 5, lines 36-60 and col. 6, lines 1-10), as described in claim 13. Regarding claim 14, Abeles discloses that at least one non-linear optical layer is controlled by an optical signal (col. 7, lines 25-30 and col. 8, lines 27-35). As to part of claim 16, Abele's discloses that part of the waveguide is tapered and transverse coupled (see figure 5). Abeles discloses that the reflector stack is a distributed Bragg reflector stack (col. 2, lines 1), as mentioned in claim 24. Regarding claim 25, the method limitation of being "fabricated in part by deposition..." has been given no patentable weight, because Applicant is claiming an apparatus not a method of fabricating. Abeles's disclosure shows (fig. 4) two waveguide layers; the first (351) for guiding a surface guided optical mode above a single multi-layer reflector stack (340), and the second (342) for guiding

Art Unit: 2874

an optical mode along a core layer between two reflector stacks (341 and 340), as described in claims 26 and 27. With reference to claim 47, Abeles shows a grating in one of the layers (303). Abeles discloses that the reflector stack is a dielectric reflector stack, wherein the stack alternates low and high index layer of GaAs and AlGaAs (col. 7, lines 35 and col. 5, lines 45-50) and the waveguide includes at least one semiconductor layer, as explained in claims 48-50. With reference to claims 51-59, the make-up of the multi-layer waveguide is a non-critical design choice and does not further limit the scope of the invention; therefore it would have been an obvious modification of the prior art.

Although, Abeles does not explicitly state active or passive modal index matching, as mentioned in claims 1, 12, 15-18, one of ordinary skill would recognize that modal index matching is a desirable feature when attempting complete power transfer between the device component and the transmission waveguide. Additionally, Abele's device would inherently actively match the modal index when applying different levels of the control signals to the electrodes disposed on the substrate such that a maximum amount of signal is transferred. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to (1) use modal index matching in the device disclosed by Abeles (2) that active modal index matching occurs as a result of current injection through the electrodes disclosed by Abele, and (3) Abeles's device could act as a switch according to the applied control signal.

Art Unit: 2874

Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abeles in view of Sadot U.S. Patent No. 6,222,964. Refer to the appropriate drawings or parts of the specification. Abeles as applied above, discloses an optical device with essentially all of the limitations of the claimed invention, including the limitations of claims 21 and 22; however, the reference does not explicitly state that the device could be used as a switch.

On the other hand, Sadot discloses an ultra-fast tunable optical filter that teaches the limitation that the Abeles reference fails to explicitly mention. Regarding part of claims 19 and 20, Sadot discloses a waveguide structure (fig. 11A) for transverse signal transmission between a waveguide (47) and an optical device component (43), wherein the structure is adapted for allowing maximal transmission of the optical signal in response to a first control signal level, or allowing minimal transmission of optical signal in response to a second control signal level, or an intermediate transmission level in response to a third control (col. 14, lines 10-40). Sadot teaches that it is advantageous to be able to control the coupling ratio between the transverse coupler using a control signal (col. 14, lines 47-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Sadot with the device disclosed by Abeles to arrive at the claimed invention.

### ***Conclusion***

Examiner has become aware of a number of co-pending applications claiming a similar subject matter. Applicant is cautioned to maintain a clear line of demarcation between the applications.

The prior art documents submitted by the applicant in the Information Disclosure Statement filed on May 5, 2003, have all been considered and made of record (note attached copy of form PTO-1449).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Butler U.S. Patent No. 6,282,219 discloses a substrate stack construction for enhanced coupling efficiency with a waveguide transverse coupled to an optical component.

Saini U.S. Patent No. 6,310,995 discloses a resonantly coupled waveguide using a taper with a tapered waveguide transverse coupled to an optical component.

Jiang U.S. Patent No. 6,424,669 discloses an integrated optically pumped vertical cavity surface emitting laser where an optical component containing a reflective stack is transversely coupled to a waveguide.

Tapalian U.S. Patent No. 6,507,684 discloses an optical device transversely coupled to a waveguide.



Forrest U.S. Patent No. 6,330,378 discloses a photonic integrated detector having a plurality of asymmetric waveguides wherein the tapered waveguide is transversely coupled to an optical device component.

Chin U.S. Patent No. 6,400,856 discloses a polarization diversity double resonator channel-dropping filter with a transmission waveguide transversely coupled to a resonator.

Deri U.S. Patent No. 5,515,461 discloses a polarization optical wavelength filter for channel dropping applications including a reflective stack.

Jiang U.S. Patent No. 6,339,607 discloses an apparatus for modulated integrated optically pumped vertical cavity surface emitting lasers for transverse coupled to a waveguide.


Hwang U.S. Patent No. 6,560,259 discloses a spatially coherent light surface emitting, grating coupled quantum cascade laser with unstable resonance cavity for coupling an optical device component to a transverse waveguide.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel E Valencia whose telephone number is (703)-305-4399. The examiner can normally be reached on Monday-Friday 9:30-6:00.

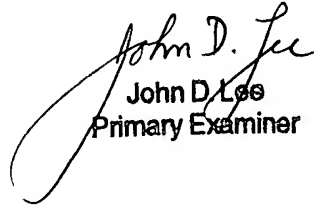
The fax phone numbers for the organization where this application or proceeding is assigned are (703)-308-7724 for regular communications and (703)-308-7724 for After Final communications.

Art Unit: 2874

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

A handwritten signature in black ink, appearing to be 'DEV' or similar, written in a cursive style.

DEV  
June 25, 2003

A handwritten signature in black ink, reading 'John D. Lee', written in a cursive style.

John D. Lee  
Primary Examiner